That expedition consisted of two vessels, the *Alert* and *Discovery*, and its primary object was to reach, if possible, the North Pole. Leaving England in the summer of 1875, the vessels proceeded through Davis Strait to Smith Sound, where a secure harbour was found in which to moor the *Discovery*, to form a base of retreat, whilst the *Alert* pushed northward as far as was possible. The ice in the northern part of Smith Sound presented unexpected obstacles, and subsequent observations showed that the polar basin northward of Smith Sound produced masses of icebergs and floes which, being drifted against the coast, were piled one on the top of the other and closed all navigation excepting between the coast and the ice grounded near it. Here, again, the skill of Captain Nares guided the vessel into a fairly secure position between the coast and the grounded ice, a position which it would have been unsafe to take excepting for the *Discovery* left in a secure harbour as a base to fall back on. The winter of 1875–6 was spent in organising sledge parties, one of which, under Commander Markham, was to get as far northwards as possible, one under Lieutenant Pelham Aldrich was to proceed along the coast line in a northwesterly direction, and the third, under Lieutenant Beaumont, was to cross Smith Sound and proceed northward along the Greenland coast. The expeditions along the coast line were successful, as there the ice offered comparatively little obstruction to sledge work, but the rough, hummocky ice encountered by the party under Commander Markham proved to be of such a nature that progress to the northward was very slow and difficult, and the hardships which his party underwent can scarcely be exaggerated.

The sledge parties returning to the vessels towards the end of the summer, Captain Nares decided that it was useless trying to reach the pole from Smith's Sound, and proceeded homewards. The manner in which the *Alert* was extricated from her perilous position and brought safely to England with the *Discovery* was a feat of seamanship any man might be proud of.

After his return from the Arctic Captain Nares was made K.C.B., in recognition of his services, and in 1878 was again given command of the *Alert* to prosecute surveying work in Magellan Strait, but was recalled from that ship in 1879 to act as Marine Adviser to the Board of Trade. This appointment he held for about twenty years. During his retirement, like many another sailor, he took up gardening and was very successful in growing roses.

He died on January 15 and was buried at Long Ditton Church on January 19. The funeral was attended by Captain J. F. Parry, R.N., the hydrographer, who represented the Admiralty, and by several naval officers, most of whom received their first instruction in seamanship from him on board H.M.S. *Britannia*, and many of whom were associated with him in his Arctic Expedition or in the *Challenger* exploring expeditions.

## NOTES.

THE Executive Committee of the proposed Meteorological Conference at Edinburgh has handed over to the Scottish Meteorological Society the balance of the funds subscribed for the expenses of the meeting with the hope that when the opportunity once more arises the society will take the initiative in carrying the project into execution. It has been decided that the committees in London and Edinburgh shall be kept in being.

WE learn from *Science* that Prof. J. H. Pettit, professor of soil fertility in the college of agriculture and chief of soil fertility in the experiment station of the University of Illinois, died on December 30 at Pasadena, California; and that Prof. S. B. Christy, professor of mining and metallurgy in the University of California and dean of the college of mining, died in Berkeley, California, on November 30, 1914, at the age of sixty-one years.

PROF. GEORGE FORBES, who has been entrusted by Lady Gill with the duty of preparing a memoir of her late husband, asks us to announce that he would be glad to be favoured with any letters which have been preserved by Sir David Gill's numerous correspondents; and would greatly appreciate any notes—narrative, historical, appreciative, or anecdotal—relating to Sir David's life and personality. All original letters or other documents will be carefully preserved, and returned to the senders at as early a date as possible. Such communications should be addressed to Prof. Forbes at 11 Little College Street, Westminster.

OWING to the war, the fifth International Congress of Philosophy, arranged to be held in London next September, has been abandoned. The General Organising Committee has expressed an earnest hope that the confederacy of the entire philosophical world, which has subsisted since the inauguration of the series of congresses in 1900, and seemed to have attained the rank of a permanent institution, will not be set aside for a longer time than outward circumstances render absolutely imperative. The committee has pledged itself as soon as possible after peace is restored to promote the continuance of this international bond, either by renewing the invitation to meet in this country or by obtaining an invitation from a neutral country.

A REUTER message from New York states that at a dinner given on January 14 at the Aero Club of America, Government officials announced a plan of the Post Office Department to introduce into the postal service 2000 airmen, who would carry sacks of first-class mails. The routes have already been selected by the Department, and it is hoped that the Bill authorising this scheme of aerial transportation of mails will pass next Congress. It may be recalled that, with the sanction of the Postmaster-General, an aerial postal service, for the idea and organisation of which Mr. D. Lewis Poole was chiefly responsible, was carried out successfully between Hendon and Windsor on September 9, 1911, that is, in Coronation year. A sack of letters was conveyed between these two places in thirteen minutes, and the experiment created great interest at the time. It may be some years before a regular aerial service is established for the transportation of mails, but the report from New York suggests that we are getting within measurable distance of it.

THE *Chemist and Druggist* announces the death on December 28, 1914, at seventy-three years of age, of Prof. Karl Liebermann, professor of chemistry in the Technical High School, Charlottenburg, Berlin.

THE death of Mr. J. S. Harding on January 11, in his seventy-sixth year, has deprived science of a life-long meteorologist. He had been connected with the Meteorological Office since its establishment in 1854, and was private secretary to Admiral FitzRoy—the meteorological pioneer. He retired in 1906, after a service of more than half a century, leaving behind him an abiding memory, having secured the hearty appreciation of the committee and council of the office and the sincere friendship of his colleagues. All who knew Mr. Harding have reason to remember his ever-courteous personality and willingness to help inquiry into meteorological literature in any direction. He had been a member and fellow of the Royal Meteorological Society since 1866, and had contributed valuable work to the researches of the society. He had mastered the chief European languages—a notable asset for the study of international meteorology—and was an esteemed contributor to the columns of NATURE to the very week of his passing into silence.

DR. DE FILIPPI has reported to the Royal Geographical Society at some length upon the work of his expedition in northern Kashmir. Two parties, led respectively by himself and by Major Wood, have gone far to establish knowledge of the topography of the Remo glacier basin and the watershed between it and the Karakoram pass. Their researches appear to necessitate the substantial modification of existing maps, in regard not only to the extent of glaciers, but also to the position of the watershed and defluent valleys. The Remo glacier-field is found to feed both the Indus and the Yarkand systems, and thus to send some of its water down either slope of the Himalayan system, to the Arabian Sea on one hand, and to the Tarim depression in the Central Asian desert on the other. The expedition is continuing its work, which has been extended into Chinese Turkestan.

THE Russian Supplement which accompanied the *Times* of January 15 dealt mainly with economic aspects of the war as especially affecting that country, and some of them, such as the question of the position of the chemico-pharmaceutical industry, call for scientific attention. The possible development of British and Russian commercial relations is treated of at considerable length, and among other interesting commercial discussions are those dealing with the sudden strain placed upon the port of Archangel, with the arctic sea route to Siberia, and with other facts and problems of communication. In another department we find a study of the distribution of Germans in Russia, accompanied by an instructive map, which shows how Germans have established themselves in greatest numbers in some of the best provinces (not necessarily nearest their own frontier), and how they largely populate also some of the great towns, with important political results. Another article discusses the tribes of the Yenisei valley.

ON several occasions recently, writers in the daily Press have suggested that the barbarous methods of warfare adopted by German forces represent the natural result of close attention to scientific teaching, and we are warned against letting our educational institutions be dominated by the same materialistic spirit. It would be juster to associate the humanities rather than science with the cause of the present war, and to say that whatever success has been achieved by the enemy is due to the application of scientific knowledge. There is, unfortunately, little danger that science will be given a prominent or important place in our schools or universities, or that our public men, officials, and writers will understand that it is not only essential to national welfare, but also in addition an intellectual outlook and a standard of truth. The only literary man who knows these things and endeavours to impress them upon the public mind is Mr. H. G. Wells; and for his efforts to awaken the British people to a sense of what their neglect of systematised natural knowledge signifies, we cannot be too grateful. An article by Mr. Wells in the *Daily Chronicle* of January 19 describes truthfully the discouraging conditions attached to scientific study in this country, and the mental inertia which has to be overcome before use is made of scientific knowledge or expert opinion. He pleads for the organisation of a thinking department for collecting, testing, and developing new ideas, such as was referred to by Lord Selborne in the House of Lords a few days ago, and his forcible words may perhaps stimulate interest in intellectual activity for the benefit of the State. It has never been more necessary than it is now to insist upon fuller recognition of the claims of science in education and in public affairs, and for that reason we hope that Mr. Wells will make further and similar contributions to national enlightenment.

THE evidences in favour of the protective treatment against typhoid fever are of many kinds. There is the analogy between this protective treatment and the protective treatments against cholera, anthrax, and plague. There is the authority of the years of hard work spent by men of science over the bacteriology of the fever. There is the whole strength of the medical profession; Sir William Osler and Sir Lauder Brunton have well said, in the *Times*, what their brethren are saying everywhere. Above all, there is the final and irreversible judgment of nature herself. We read, only a fortnight ago, how she has tested this treatment, in northern France and Belgium. Our men in the field may be divided into three classes: (*a*) fully protected, (*b*) partly protected, (*c*) non-protected. The proportion of cases has been 1, 6, and 16; that is to say, the non-protected have been punished sixteen times more than the protected. We read, only a few days ago, how nature made a similar experiment among the French troops in the field. That seems to be her invariable rule, to pick out the unprotected. How could she do otherwise? What else do we expect of her? For we have got this protective treatment straight from her; it has been copied out of her book. We protect our men from having typhoid once, by giving them a dose of the very stuff which she gives them to protect them from having typhoid twice. The treatment is not perfect; but it does protect our men from the misery of illness or death, and from the grave offence of spreading infection among their friends. Meanwhile, the anti-vivisection societies are hard at work, doing all that they can to rob our men of this protection; and that by methods which are singularly repugnant to public opinion.

THE announcement that the King has been pleased to approve the grant of a Royal Charter of Incorporation to the Institution of Mining and Metallurgy, is one of interest and importance to those interested in the mining industry, as well as to the profession represented by the institution. Its objects are defined in the charter as for "the advancement of the science and practice of mining in respect of minerals other than coal and of metallurgy in respect of metals other than iron." The institution was founded in 1892, and its founders wisely based qualification for membership upon strictly professional lines, avoiding the temptation, which some other kindred societies were unable to withstand, to open the door wide from considerations of finance. This test for admission to its ranks has been maintained and strengthened in the intervening years, and a high professional standard has been attained by rigidly scrutinising the statements of candidates for admission and by direct inquiry with a view to their confirmation. The council also has the right, which is exercised, to investigate cases of alleged breach of professional conduct, and to expel any member against whom such a charge has been substantiated. In 1905 the membership of the institution was 1324, and at the end of 1914 it was 2500. The institution occupies its own freehold house at No. 1 Finsbury Circus, E.C., and has an ordinary income of more than 5000*l.* Its influence for good in the educational, technical, and professional world has well merited the recognition bestowed upon it by the Crown.

AMETHYSTS were used extensively by the ancient Egyptians, and it has hitherto been a puzzle whence they obtained the stone. In the *Cairo Scientific Journal* for August, 1914, Mr. G. W. Murray reports that he and Mr. C. M. Firth recently found a piece in Wadi Bahan in lower Nubia, and in May this year Mr. G. B. Crookston discovered considerable workings for amethyst near Gebel Abu Diyeiba, and practically on the footpath between the phosphate mines of Wasif and Um Huetat. The workings are very extensive, and the amethysts occur lining cavities in a kind of red granite. These cavities occur along veins in the granite, which run in remarkably straight lines for hundreds of yards.

WITH reference to Dr. Bastian's paper on the production of fungus-germs and other living forms from Zooglœal masses (NATURE, December 24, 1914, p. 462) Dr. Margaret C. W. Young directs attention to work she has carried out on the apparent development of very different forms of living organisms from a single parent one. Thus by heating spores of *Bacillus subtilis* in a weak alkaline solution to 110° C., colonies of cocci, streptococci, and yeasts were observed to develop. By other treatment *subtilis* cultures seemed to pass into protozoal stages. Dr. Young holds that bacteria of the *B. subtilis* and *mesentericus* groups are really sporozoites of a protozoon the life-history of which embraces amœboid, flagellate, sporulating, and granular forms. In this, the sexual part of the cycle, the organism is almost invariably parasitic. Outside the host, it exists in fungal forms which may range from a coccus to an aspergillus (*British Medical Journal*, September 25, 1909, and October 3, 1914).

To Captain Stanley Flower, director of the Giza Zoological Gardens, we are indebted for a copy of a new issue of his list of the zoological gardens of the world, apparently published at Cairo. In normal times the list should have been revised up to the end of 1914, and published in January, 1915; but the war rendered this impracticable, and it is therefore corrected only down to the end of July last. The entries include 166 different establishments, public and private.

IN NATURE of July 9, 1914 (p. 478), a letter was published from Mr. Lydekker in which it was stated that an okapi sent home by Dr. Christy from the Belgian Congo had been mounted with true horny sheaths on the bony horn-cores. To make sure that there had been no mistake Mr. Lydekker wrote to Dr. Christy, who is now in the Congo, asking whether the animal had been correctly mounted in this respect. We understand that in a reply just received Dr. Christy says, "quite correct."

THE opening article in the January number of the *Museums Journal* is devoted to the Royal Natural History Museum of Belgium (see p. 404). Although Belgium possessed natural history collections of considerable value at a much earlier date, it was not until 1846 that the museum in Brussels was placed on a permanent footing, Vicomte du Bus, who did such good work on the fossil whales of the Antwerp Crag, being the first director. A new era in the history of the institution was inaugurated when Dr. E. Dupont was appointed director in 1868. In 1891, under the same director, the transference of the collections to a building in the Parc Leopold, originally constructed for the offices of the old zoological gardens, was completed, and the new museum, as it had now become, was opened by H.M. King Leopold II. The accommodation was soon, however, found to be altogether inadequate for the proper housing and display of the collections; and a comprehensive scheme of additions was planned. Only a portion of this scheme has, however, yet been carried out—the remainder is likely to remain *in nubibus* for many a long year.

THE last number of the Journal of the Quekett Microscopical Club is especially interesting in containing a report of the 500th ordinary meeting. Mr. A. E. Hilton has a useful note on the continuous cultivation of the Mycetozoon *Badhamia utricularis* on moistened bread, to which from time to time there may be profitably added a mixture of ammonium phosphate and cane-sugar. The minimum visibile (apart from the ultra-microscope) is discussed by Mr. A. A. C. Eliot Merlin, who finds that the diameter of a particle just visible under a 1/12th apochromat with a working aperture of 1·4 is 1/377,358th of an inch. The diameter of the flagellum of *Bacterium termo* was estimated by Dallinger at 1/204,700th of an inch, but Merlin finds it to be about double that, namely, 1/112,200. C. F. Rousselet has a note on the sexual stages of two African species of Volvox, *Volvox africanus* and *V. rousseleti,* the vegetative colonies of which were previously described by Prof. G. S. West. Mr. E. M. Nelson discusses various forms of binocular microscope, a much-needed low-power condenser, and a new object glass produced by Zeiss in which a near approach has been made towards apochromatism without the use of fluorspar. Just as oil immersions have eclipsed water immersions, so will this new lens, according to Mr. Nelson, supersede the wide-angled dry lenses, which should all be scrapped.

THE Kew Bulletin, No. 10, 1914, contains a paper on *Hedychium coronarium* and allied species, which is of value in connection with the interest aroused in these plants as a source of material for paper-making. The eight allied species are chiefly distinguished by the floral characters, of which illustrations are given. It seems probable that all these Hedychiums would be useful for paper-making. It will be remembered that the paper made from this plant is self-sized, and can be written upon with ink directly it leaves the machine without further treatment.

THE native plants of the Azores are discussed by Dr. H. B. Guppy in *Kew Bulletin,* No. 9, 1914. The vegetation of the mountain of Pico, 7613 ft., was particularly studied, with its European flora on the higher levels—ling, St. Dabeoc's heath, thyme, etc.—and the characteristic Azorean plants below 5000 ft., such as *Erica azorica, Juniperus oxycedrus,* and the Azorean holly, *Ilex perado.* The Faya tree, *Myrica faya,* is a dominant tree in the lower woods, but the forest trees generally are small, owing to the depredations of the wood-cutters. The indigenous plants are few, the flora is largely European in character, with a few affinities with Africa and the Canaries, *Myrsine Africana* affording the most remarkable connection with the continent. It seems probable that the flora of the Azores is relatively recent and can be accounted for by existing agencies of dispersal in contrast to the Canaries and Madeira, the flora of which is ancient, dating back probably in part to Miocene times.

THE occurrence of pitchblende in the Quartz Hill district, Gilpin Co., Colorado, is described by Mr. E. S. Bastin in Professional Paper, 90 A, United States Geological Survey (1914). The ore is found in veins with pyrite and copper pyrites, and is connected by the author with Cainozoic intrusions of monzonite (diorite with orthoclase).

SINCE the reference made in NATURE of November 26, 1914 (vol. xciv., p. 348) to the Upper Jurassic fauna of the Spiti Shales of the Himalayas, the study of the mollusca has been continued by Miss Paula Steiger in Vienna (*Palaeontologia Indica,* series xv., vol. iv., fasc. No. 5). The author wisely remarks that the comparison of the brachiopods with Mediterranean forms is due to our far too scanty knowledge of members of the group from other parts of the world. Here we have a hint to palæontologists and collectors.

THE 792 pages of the Annual Report of the Geological Survey of Iowa for 1913, which has just been issued, are almost entirely occupied by an elaborately illustrated account of the materials for roads and concrete throughout the State. This systematic report provides much information about the nature of the glacial and interglacial beds. In places, the imported boulders of gneiss and granite in the thin Iowan drift are as valuable as those in the North German plain, and are similarly collected for use on the macadamised roads.

IN the December number of the *Agricultural Students' Gazette,* Prof. G. S. Boulger discusses some problems of ecology as illustrated by Gloucestershire flowering plants. He divides the factors of ecology into three main groups, (*a*) the inherent characters of the plants, (*b*) the environment, and (*c*) the relations of (*a*) and (*b*). Many species of plants, commonly regarded as characteristic of a particular feature in their normal environment, are found flourishing under conditions where this very feature is notably weak or even absent. Thus, the calcicole or lime-loving Pasque-flower (*Anemone pulsatilla,* Linné) will grow well in a rich garden soil poor in lime; the Bee Orchis (*Ophrys apifera,* Hudson), most commonly found in England on limestone, is also luxuriant on the Upper Lias, near Leckhampton. Again, the Fritillary (*Fritillaria meleagris,* Linné) occurs habitually in meadows liable to inundation, but has been found in a wood near Fairford fully twenty feet above the water level. Another species of riverside plant, the Meadow Crane's-bill (*Geranium pratense,* Linné), abundant by Severn and Avon at Tewkesbury, is not uncommon in seemingly dry hedgerows on the Cotteswolds. Little is known of the precise conditions that determine the topographical distribution of common species, and a plea is put forward for the investigation of these and other interesting problems suggested in the paper.

WE have been favoured with a copy of an interesting address by Dr. F. A. Carpenter (local forecaster) entitled "Flood Studies at Los Angeles," reprinted from the U.S. *Monthly Weather Review* of June last. The object of the paper (which is accompanied by tables and diagrams) is to explain, generally, some of the causes and pertinent features of such rain storms, and to investigate more particularly that of February 18–21, 1914. The rainfall of South California is subject to great variations; the average annual fall at Los Angeles is 15·5 in., the extremes being 5·6 in. (1898–9), and 38·2 in. (1883–4). Rain only occurs during parts of the year; South California would be practically rainless were it not for the southern deflection of the paths of some of the northern storms. During the past thirty-seven years the harbour of San Pedro (near Los Angeles) has only been silted up five times by floods, although the latter are of frequent occurrence. When the first rain is steady it soaks into the land, and no floods occur; but during the next period of rainy weather they generally take place. Dr. Carpenter's useful paper should be read in conjunction with Prof. A. G. McAdie's elaborate memoir on the "Rainfall of California" (NATURE, October 15, 1914).

IT is not so long ago that *Punch* published a cartoon of artists painting pictures intended to represent "old masters," of which one-half had been restored by a particular process. In the *Museums Journal* Mr. I. J. Williams, of the Welsh National Museum, describes his experiences in cleaning pictures himself after vainly attempting to obtain satisfactory results by employing outsiders. The process is, of course, comparatively simple, involving nothing more than rubbing off the old varnish with cotton-wool dipped in a mixture of four parts of methylated spirit to one of turpentine, but he finds that considerable skill is required in stopping the process at exactly the right stage. With a view to the future preservation of the pictures it would, however, be desirable to make very careful inquiries as to the character of the varnish subsequently used, as it is not improbable that the old varnishes were better than any now obtainable.

OWING to the decreased output of scientific work in consequence of the war the concluding numbers of *Science Abstracts* for the year 1914 are somewhat less extensive than usual. The physics part consists of forty pages of abstracts and four of index, and the electrical engineering part of thirty-one and four pages respectively. The actual number of abstracts in the two parts is 104 and sixty-two. The average length of the engineering continues to be greater than that of the physics abstract, mainly on account of descriptions of engineering plant. Both sections of the publication continue to supply up-to-date and trustworthy information as to the advances made in many fields, and it is difficult to see how any scientific or technical worker in either subject could now dispense with *Science Abstracts*.

ACCORDING to an editorial note in the *Scientific American* for December 26, 1914, a series of articles will be published early in the present year dealing with the necessity of encouraging in every possible way the scientific researcher in order to make the industries of America more independent of Europe. The editor is of opinion that many manufacturers who at present depend on Europe for some portion of their raw material for technical processes could, by stating their difficulties to a man of science willing to undertake the necessary research, obtain at a relatively small cost information which would place them on a much firmer footing. We have no doubt these articles will be read with interest in this country, as the attitude of the British manufacturer towards research is by no means so cordial as it ought to be.

A POPULAR edition of Prince Kropotkin's "Mutual Aid: A Factor of Evolution," has been published by Mr. William Heinemann, at the price of 1*s*. net. This cheap re-issue of an important work appears at an opportune moment. Many German writers are excusing the horrors of the war by representing them as unavoidable consequences of the struggle for existence. As our review of the first edition of "Mutual Aid," in the issue of NATURE for January 1, 1903 (vol. lxvii., p. 196), pointed out, Prince Kropotkin shows that in the case of animals, there is very little evidence of any struggle for existence among members of the same species, and no justification can be found for the crude conception of Darwinism which places selfish interests among the desirable attributes of the human race. We welcome this cheap edition of Prince Kropotkin's noteworthy exposition of evolutionary ethics, and we hope it will have the wide circulation its lucidity and charm deserve.

THE Cambridge University Press will shortly issue a new edition—the third—of "Zoology," by Drs. Shipley and MacBride. The work has been thoroughly revised, many portions being re-written, and several new illustrations added.—Messrs. Methuen and Co., Ltd., announce the forthcoming publication of a further selection of Sir E. Ray Lankester's popular science articles. It will be entitled "Diversions of a Naturalist."

## OUR ASTRONOMICAL COLUMN.

SPECTRAL LINE DISPLACEMENTS AT THE SUN'S LIMB.—As a further research in connection with the work carried on at the Kodaikanal Observatory on the displacement of spectrum lines at the sun's limb, Mr. A. A. Narayana Ayyar contributes to Bulletin No. 44 of the Kodaikanal Observatory the results of his work on the displacements at the sun's limb of lines sensitive to pressure and density. It is pointed out that certain lines, particularly those of calcium and sodium, are much more sensitive to pressure and density than iron lines, and that therefore the limb shifts of such lines should provide a much more rigorous test as to whether there is a large difference of pressure and density between the sun's limb and centre. The paper gives the experimental details, and the result arrived at is that the difference of pressure and density between the limb and centre is very small, a conclusion in agreement with that derived by Messrs. Evershed and Royds. The balance of evidence, as the author states, is in favour of slightly lower pressure and density at the limb than at the centre of the disc.

STATISTICS OF SPECTROSCOPIC BINARY STARS.—In the *Arkiv för Matematik, Astronomi och Fysik* (vol. x., No. 6) of the Stockholm Academy, Dr. Sven Wicksell contributes a paper on the statistics of spectroscopic binary stars. Referring in the first instance to the important investigations and discussions by Campbell, Schlesinger, Baker, Ludendorff, etc., he attempts to find out other interesting properties of spectroscopic binaries. Constructing a card-catalogue of 440 binaries, he found it was composed of 104 systems, of which the period was known, seventy-nine in which the semi-amplitude of radial velocity was known and seventy-five in which the excentricity was known. All these he divided into four classes, according to their spectral type, and arranged them in tabular form. The investigation is devoted to the study of the frequency curves of the period, the explanation of the existence of two groups of periods, a reference to Shapley's investigation of eclipsing binaries, etc.,